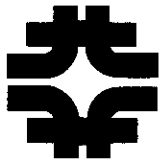

Fermi National Accelerator Laboratory

Technical Division
Headquarters

Discrepancy Reporting System

TD-2040

Version 3

Approved, Quality Assurance Officer	02 - Nov - 2001 Date
Approved, Engineering & Fabrication Head	11/2/01 Date
Approved, Development & Test Head	11/2/01 Date
Approved, Technical Division Head	2 Nov 01 Date

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1.0 System Objective

The objective of the Discrepancy Reporting system is to identify a problem at its source, to promptly report it to the appropriate level of management, and for management to take the necessary actions commensurate with the significance of the problem.

Management at all levels should foster a **no-fault** attitude, where all personnel are encouraged to identify and report performance problems to the appropriate levels of management and where appropriate actions will be taken by management.

2.0 System Scope

The scope of the system is the fabrication and measurement of production devices. Within this scope, a Discrepancy Report (DR) is completed for each occurrence of a problem, failure or nonconforming item/condition related to a component or fabrication/assembly.

The system is used for all production runs and device repairs, but is not a requirement during the research & development phase of a project. The Project Manager (or appropriate designate) decides whether or not to use the Discrepancy Report (DR) system during the R&D phase of a project.

Although DRs are not required for R&D projects, it is highly recommended to utilize this process during the R&D phase of a project. Doing so will allow the division to systematically record, track and maintain the knowledge gained during R&D fabrication.

3.0 Definitions

3.1 *Configuration:*

The physical and functional characteristics of a product, including the hardware, software, materials, parts and limit criteria that are frozen in the design documents.

For the purposes of the DR system, significant changes to cost or schedule are considered configuration changes.

3.2 *Root Cause:*

The root cause is the fundamental cause of an event. For the purposes of Discrepancy Reports the root cause is the most basic reason for the nonconformance, which when eliminated, should prevent the event from recurring.

3.3 *First-Hand Observer:*

The First-Hand Observer is the person that observes a condition adverse to quality, a nonconformance, deficiency, or discrepancy. This will normally be, but is not limited to, the person performing the specific operation where the discrepancy is observed.

Employees closest to the daily operation or activity are in the best position to understand and report nonconforming conditions.

3.4 *Responsible Authority or Authorized Designee*

The Responsible Authority is the person in charge of the area or activity of the nonconforming condition. The Responsible Authority is responsible for addressing the cause and disposition for the discrepancy, and for formulating a plan that will prevent, minimize or eliminate the condition from recurring.

The Authorized Designee is authorized by the Responsible Authority to act on his/her behalf, in his/her absence or as an expert contact in specified areas or activities for the resolution and disposition of nonconforming conditions.

4.0 Responsibilities

4.1 *Process Engineering*

The Process Engineering Group, within the Engineering & Fabrication Department, is responsible for the implementation and maintenance of the DR system. Process Engineering is also responsible for helping others in the division with initiating DRs, tracking them to closure, the final review and archiving.

4.2 *Department Heads & Project Managers*

Department Heads & Project Managers are responsible for providing adequate resources to allow for adequate resources to implement, operate and maintain the DR system. The DR system is part of how the division conducts business, and so appropriate resources must be allocated. The Project Manager is also responsible for resolving configuration issues.

4.3 *Quality Assurance Officer*

The Quality Assurance Officer is responsible for helping to develop and maintain the DR system. The QA Officer is also responsible for coordinating the appropriate training on the system.

4.4 *First-Hand Observer*

The First-Hand Observer is our first line of defense against problems working their way through our systems, and so the First-Hand Observer is responsible for continually watching for problems or potential problems. The First-Hand Observer is responsible for reporting discrepancies to immediate supervision, and for initiating (or aiding in initiating) the Discrepancy Reports.

4.5 *Responsible Authority*

The Responsible Authority is responsible for deciding if a DR is warranted, determining the root cause of the discrepancy, and for defining the appropriate

disposition and corrective action(s). The Responsible Authority is also responsible for verifying that the defined actions have been implemented. *It should be noted that the "Responsible Authority" does not have to be one person - there can be many Responsible Authorities for one DR.*

5.0 System Specifics

5.1 *Descriptions*

The flowchart in section 6.0 describes the overall process. The text below provides descriptions for each major step of the process.

Steps in flow chart:	Description:
1 - 4 Discrepancy identified	When a problem, failure, nonconforming item or condition is found, the First Hand Observer brings it to the attention of a Responsible Authority, who will decide if a work stoppage is warranted. The Responsible Authority notifies the appropriate personnel of such decision. If work is stopped, then a hold tag is attached to the device until the disposition is assigned. At this point the Responsible Authority determines whether or not a DR should be initiated. If no DR is initiated, then the problem is corrected and the work continues. *The judgement to initiate a DR should be based on whether or not there will be value in the DR, i.e. if the problem is something that is part of normal operations, then there may not be value in generating a DR. If there is something that can be learned or applied to other areas, then a DR is probably needed.*
5 - 6 DR initiated	The First-Hand Observer initiates the Discrepancy Report (DR). The First-Hand Observer may be assisted by Process Engineering and/or Responsible Authority. The section labeled "Initiator" is to be completed at this time, either by using the database (preferred) or by filling out a paper form (acceptable). The Nonconformance Description should include specific details about the discrepancy, e.g. measurement results and their specifications, part numbers, et cetera. The information provided should make the DR traceable to the point in the process of occurrence and traceable to each end item produced. *NOTE: if the form is filled out by hand, then the "DR No." field should be left blank. Process Engineering will assign an appropriate DR number.* If an identical problem occurs in multiple devices, then one DR can be written to cover the multiple devices. In this case all device serial numbers are recorded on one DR form. The DR form is forwarded to the Responsible Authority, and (s)he coordinates the DR until the verification is complete (steps 11-12).

7 Cause	A Responsible Authority conducts a root cause analysis on the discrepancy. This may be simple and informal, or may be rigorous and formal, depending on the situation. The results of the analysis are recorded on the DR form. If a root cause cannot be identified or determining the root cause is too expensive, then "unknown" should be recorded, along with an explanation as to why the root cause was not determined.
8 - 8a Disposition	A Responsible Authority determines and records a disposition for the discrepancy. The disposition should either be a plan to render the item or condition acceptable for use (e.g. repair, rework, replace, substitute, change process), use as-is, or to scrap the discrepant item. *A disposition of "use as-is" must include an engineering justification.* The assignment for implementing the disposition may be formal or informal (i.e. written or verbal). The disposition can be implemented before, during or after the determination of the corrective action. Disposition authorities are as follows: [1] The responsible Design Engineer, and/or designer dispositions nonconformances relating to magnet items, components, parts, their design and acceptance for use. [2] The responsible Fabrication Manager, Production Manager and/or the QA Manager dispositions nonconformances related to human error or actions. [3] The responsible Fabrication Manager, Production Manager, Process Engineer and/or the QA Manager dispositions nonconformances related to the fabrication/assembly processes, and those actions which complete each step. [4] The responsible Fabrication Manager, Production Manager and/or Tooling Engineer dispositions nonconformances related to the acceptability, and design of tooling, parts, or equipment used in the fabrication, and assembly of magnets or components. [5] The responsible Design Engineer, designer, Physicist and/or QA Manager dispositions nonconformances relating to the acceptability of electrical, vacuum, pressure test, flow test mechanical, brazing/welding, and other inspections/tests taken during fabrication and assembly of a magnet or component.

9 - 10a Corrective Action	A Responsible Authority determines and records corrective action(s) for the discrepancy. The corrective action(s) should be a plan to prevent the discrepancy from recurring. The effect on configuration is also recorded. If the corrective action(s) effect configuration, then the Responsible Authority communicates the effects to the Project Manager. The Project Manager is responsible for resolving the configuration changes. The assignment for implementing the corrective action(s) may be formal or informal (i.e. written or verbal). The defined corrective action is either implemented immediately, or is assigned to another system to track (e.g. a traveler revision request is initiated). If the Responsible Authority decides that there is no appropriate corrective action, then "N/A" should be recorded, along with an explanation as to why no corrective action is required.
11 - 12 Verification	A Responsible Authority verifies that the disposition and corrective action(s) have been implemented, and that (s)he believes that they will be effective. If the corrective action(s) result in the creation or revision of travelers and/or drawings, then the TRR/ER/ECO number(s) is recorded. If the actions have not been completed or not assigned to another system, then the "Verified By" section of the DR form should not be signed off without appropriate explanation. If the implemented actions are not likely to be effective, then the process should start over by determining the root cause, et cetera. After the actions have been verified as completed and likely to be effective, the DR form is sent to Process Engineering.
13 - 13a Review	Process Engineering performs a review of the DR. The purpose of this review is twofold: 1. Ensure that the form has been filled out completely. If there are empty fields, it should go back to the Responsible Authority for completion. 2. Ensure that the information recorded and the actions completed/assigned make sense. If there is any question, the Responsible Authority should be asked for clarification. After the review is satisfactorily completed, Process Engineering approves the DR and determines the appropriate problem area (i.e. the 5 Ms - material, manpower, method, machine or measurement). The DR is now officially "closed", and is forwarded for archiving.

14 Archiving	The DR, and all its attachments are archived in OnBase (either through scanning or direct importing). All other associated documents (e.g. digital pictures, inspection data/reports) should also be imported and indexed in OnBase.
15 Closure	The closed DR is sent back to the Initiator, and is stored with the traveler (or other document) it was written against. If the DR is for an item that is returned to Material Control, then a copy of the DR accompanies the item.

5.2 *Timing*

Many corrective action programs define time frames for when each step should be completed (e.g. determine root cause and disposition within 5 days after the DR was initiated). We have specifically not defined timing because we prefer to rely on people to complete the process in the most appropriate timing for the specific situation. In the event that timing for completion becomes unreasonable, timing requirements can be added to the process.

5.3 *Connection to Traveler Revision Requests*

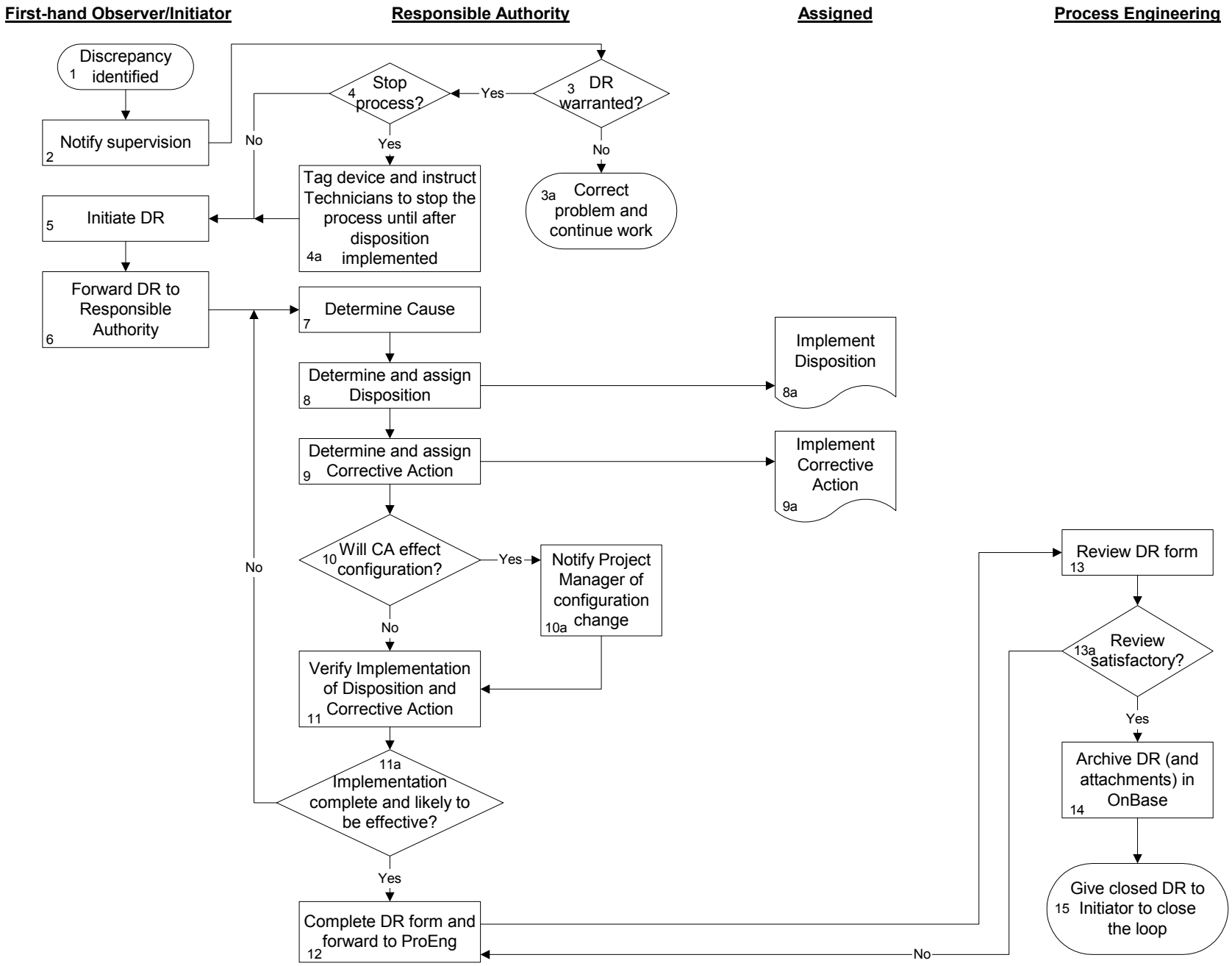
Travelers, Discrepancy Reports (DRs) and Traveler Revision Requests (TRRs) are three tools used to control the production process. These tools are designed to aid in assuring consistency and tracking what has been learned.

The purpose of the TRR is to initiate and track changes to the travelers. As part of corrective action a DR can initiate a TRR (see step 9 above). It is understood that changes to travelers may not be completed prior to the next issuing and usage of the traveler in question, i.e. the traveler being revised may need to be issued to production as the previous revision before the changes can be enacted. When this occurs, the following actions take place:

1. A copy of the TRR is issued with the traveler;
2. The section(s) of the traveler that are to be changed are marked up, with a pointer to the TRR number;
3. ***Prior to the completion of the traveler revision, if the same discrepancy is identified again another DR does not need to be written***. There is no value is generating multiple DRs for the same problem. Simply mark in the traveler the appropriate notes to demonstrate that the problem was identified and it is in the process of being remedied.

6.0 Process Flow Diagram

The following diagram depicts the flow of the Discrepancy Report process, and defines the persons/roles responsible for each step:


First-hand Observer/Initiator
Responsible Authority
Assigned
Process Engineering
1 Discrepancy identified
2 Notify supervision
3 DR warranted?
3a Correct problem and continue work
4 Stop process?
4a Tag device and instruct Technicians to stop the process until after disposition implemented
5 Initiate DR
6 Forward DR to Responsible Authority
7 Determine Cause
8 Determine and assign Disposition
8a Implement Disposition
9 Determine and assign Corrective Action
9a Implement Corrective Action
10 Will CA effect configuration?
10a Notify Project Manager of configuration change
11 Verify Implementation of Disposition and Corrective Action
11a Implementation complete and likely to be effective?
12 Complete DR form and forward to ProEng
13 Review DR form
13a Review satisfactory?
14 Archive DR (and attachments) in OnBase
15 Give closed DR to Initiator to close the loop
Yes
No

Revision History

Version	Date	Section No.	Specifics
1	4/13/94	All	First version
2	10/5/94	5.1	Disposition "use as-is" must include an engineering justification.
3	31-Oct-2001	All	Updated to reflect organizational and policy/procedure changes. Added flow chart.

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